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TAGS: TBIO EAID PINR ECON SOCI KN
SUBJECT: NORTH KOREA STRUGGLES WITH SHORTAGE OF MEDICINE AND EQUIPMENT FOR CONFRONTING INFECTIOUS DISEASES

REFS: A) 07 SEOUL 1080
B) SEOUL 499

SUMMARY

¶1. (SBU) Famine, natural disaster, mismanagement, a lack of safe drinking water, and shortages of essential drugs and vaccines have left the population of the Democratic Peoples' Republic (DPRK) vulnerable to infectious diseases, despite the existence of an adequately-trained corps of medical personnel in the regime's four-tiered state medical system. The most troublesome infectious diseases currently include tuberculosis, malaria, hepatitis B, diarrheal diseases, and intestinal parasites. The looming food shortages in North Korea will likely further aggravate the disease burden of the population. If relations between the United States and the DPRK improve, and if North Korean authorities become more open to outside humanitarian aid, the infectious disease problem in the DPRK could provide the United States with numerous opportunities (beyond existing projects) to reach out to the North's public by providing drugs, vaccines, diagnostic equipment, and other much-needed health-related aid. End summary.

SCIENCE FELLOW EXAMINES INFECTIOUS DISEASE IN DPRK

¶2. (SBU) Dr. Karl A. Western, MD, DTPH, Senior International Scientific Advisor at the National Institute of Allergy and Infectious Diseases (NIAID -- part of NIH), spent four weeks in November 2007 in Embassy Seoul as an Embassy Science Fellow (ESF --

see ref A), examining infectious disease management in the Democratic People's Republic of Korea (DPRK). He gathered information from Republic of Korea (ROK) government sources, ROK-based non-governmental organizations (NGOs) active in the DPRK, and international NGOs and organizations. The goal was to provide U.S. policymakers with a detailed snapshot of the DPRK public health sector, as well as to outline possible avenues for enhanced U.S. health-related cooperation with the DPRK, should our relationship improve as the denuclearization process proceeds.

¶3. (U) The project focused on four essential issues: A) the infectious disease situation in DPRK; B) the capability of the DPRK health system to diagnose and manage current endemic infectious disease as well as potential infectious disease threats; C) existing efforts by NGOs and other donors to increase the DPRK capacity to deal with infectious diseases; and D) unmet needs creating opportunities that U.S. assistance could potentially address. The following is Dr. Western's report.

Methodology

¶4. (U) Prior to beginning the Embassy fellowship, Dr. Western and Dr. Boris Pavlin, MD, MPH, a Johns Hopkins University Preventive Medicine Resident at NIAID, conducted an extensive review of public information available on the Internet on infectious diseases in DPRK. They also conducted interviews with U.S. Government (USG) agencies and organizations active in the DPRK. In Seoul, Dr. Western met with officials from the Ministry of Health and Welfare (MOHW), the Ministry of Unification (MOU), international organizations active in DPRK, and ten of the 20 ROK-based NGOs with health programs in DPRK.

¶5. (SBU) Official data from the DPRK Government on infectious diseases are incomplete, unverifiable, and may be biased by political considerations. North Korea reports few infectious diseases to the World Health Organization (WHO) and other international organizations. Multiple sources indicated that effective infectious disease surveillance and reporting do not exist in North Korea. Furthermore, the lack of microbiological and serological diagnostic laboratories results in an inability to confirm suspected diseases, and therefore in substantial underreporting. DPRK sensitivity also prevents external organizations from verifying reported figures or independently evaluating infectious disease conditions. The DPRK also does not report on a number of important infectious diseases. In those circumstances, if the disease is endemic in border areas of neighboring countries such as ROK, China, and Russia, it is reasonable to assume that the DPRK is infected with the pathogen or at risk of becoming so.

STATUS OF INFECTIOUS DISEASES IN NORTH KOREA

¶6. (U) The DPRK Government established 14 health priorities in its 2004-2008 Five Year Plan. Tuberculosis, malaria, and HIV/AIDS ranked first. Other infectious diseases (hepatitis B, intestinal infectious diseases and parasitoses) were ranked second.

Tuberculosis

¶7. (U) There was a dramatic increase of reported tuberculosis during the past decade as a result of the overall deterioration in the population's nutritional status, deterioration of the public health infrastructure, scarcity of medicines, and increased attention given to the problem. The DPRK has had a long-term commitment to tuberculosis treatment and control through its vertical National Tuberculosis Program (NTP). There are currently approximately 67 district tuberculosis care facilities (second-level) and 13 hospitals dedicated exclusively to the isolation and care of tuberculosis patients.

¶8. (U) With technical assistance from the World Health Organization

(WHO), the DPRK initiated Directly Observed Therapy Program, Short-Course (DOTS) in 1998 with a three-phased expansion to cover the country by 2004. As a result, DOTS coverage has approached 100% and DOTS case detection has increased from two percent before 1998 to 108% (sic) in 2004. In 2004, there were 52,591 cases diagnosed and treated under DOTS with successful treatment rates ranging from 88% to 94%, compared with a 76% success rate from non-DOTS treatment. According to official DPRK statistics, in 2005, incident (new and relapsed) cases of tuberculosis totaled 42,722 (178/100,000), with 3,015 deaths (13/100,000), and with a prevalence rate of 179/100,000 population. (For comparative purposes, the 2005 official incidence rate per 100,000 population was 96.4 in South Korea, and 4.5 in the United States.) Multiple drug-resistant (MDR) tuberculosis accounted for 2.8% of new cases in North Korea's official statistics, and 15% of previously treated cases in 2004. The DPRK tuberculosis program is currently supported by the World Bank Global Development Finance Program, the Global Fund to Combat AIDS, Tuberculosis and Malaria (GFATM), and donations from multiple NGOs.

¶9. (SBU) Tuberculosis is the most important infectious disease among DPRK defectors arriving in South Korea, and the incidence

among defectors is suggestive of a much higher infection rate, and of a much higher incidence of drug resistance, than are reflected in the North's official statistics. In a 2004 study of arriving defectors, 42 cases of tuberculosis (88% pulmonary) were diagnosed, giving an extrapolated incidence of 900 cases per 100,000 population. Nine tuberculosis isolates were tested for drug resistance: four were isoniazid (INH)-resistant, three were MDR, and only two were susceptible to all primary tuberculosis drugs.

¶10. (U) Major ongoing challenges in the area of tuberculosis treatment include sustaining and expanding DOTS throughout the country; improving tuberculosis diagnosis (Gram stain, X-ray, sputum culture, drug-sensitivity testing); ensuring the availability of primary tuberculosis drugs and secondary drugs for MDR cases; and shifting tuberculosis care from isolation facilities to ambulatory treatment.

Malaria

¶11. (U) Although the fact was never certified by WHO, the DPRK was considered free of indigenous malaria from the 1970's to 1998, when Plasmodium vivax reemerged in human populations on both the north and south sides of the Demilitarized Zone (DMZ). To date, indigenous malaria in North Korea has been exclusively P. vivax with no confirmed resistance to chloroquine. Mefloquine, however, appears to be the most commonly administered drug, often without the addition of an appropriate drug (e.g. primaquine) to eliminate the hepatic stage of the parasite to prevent relapses. Endemic malaria continues to be largely confined to the DMZ, but potential mosquito vectors occur throughout the country below 2,000 meters. The press reported malaria outbreaks in Pyongan Namdo Province in 2006 following monsoon-related heavy rainfall.

¶12. (U) In response to the malaria epidemic, DPRK and WHO established a Malaria Control Program in 1999. The number of officially-reported cases surged to 295,570 in 2001, but by 2006 the number reported dropped to 9,300. According to the latest detailed reports (2003), only 26% of cases were confirmed by peripheral blood smear. Malaria reports among children (962 cases) and pregnant women (92 cases) were relatively low. No hospital malaria deaths were reported. During that same year, WHO reported that 0.7% of deaths in children less than 5 years old were attributed to malaria infection. Dr. Western could find no information about mosquito vector ecology and epidemiology and was told that the DPRK considers this a sensitive issue. (In contrast, the ROK has conducted epidemiology and vector biology studies of vivax malaria south of the DMZ. This information is available in peer-reviewed publications and in reports of the Korea Center for Disease Control and Prevention (KCDC).)

¶13. (U) The DPRK malaria control program relies upon the distribution of donated permethrin-impregnated bed nets, treatment of clinical cases, and prophylaxis of high-risk populations such as the military and civilian populations along the DMZ. In 2003, 90,360

new bed nets were sold or distributed, and 394,000 bed nets were treated or retreated with insecticide. No data were available on total malaria drug donations.

¶14. (U) Ongoing challenges include increasing the percentage of confirmed malaria cases through peripheral blood smear examination, more appropriate treatment of malaria cases to prevent relapse, maintaining the availability and use of appropriate anti-malarial drugs, sustaining the bed net program, and a better understanding of malaria epidemiology in North Korea to develop scientifically-based

prevention and control strategies.

HIV/AIDS

¶15. (U) North Korea denies the existence of HIV infection and clinical AIDS cases. The United Nation AIDS Agency (UNAIDS) estimated (2004) that there were fewer than 100 cases in the country. DPRK HIV/AIDS surveillance consists almost entirely of screening blood donors, foreign visitors and returning North Koreans. In 1988, the DPRK issued a Public Health Directive on HIV/AIDS, usually an indication that there is an actual or real threat. In October 2003, the Ministry of Public Health organized the first national HIV/AIDS workshop.

¶16. (U) To date, only one DPRK defector has tested HIV positive and his infection may have been acquired in a transit country.

¶17. (U) While the level of HIV infection is currently extremely low, DPRK is at risk from the disease due to unsafe medical injection practices, decreased blood screening due to economic constraints, and increased population movements both within the country and to third countries, such as China, where HIV prevalence is increasing.

Hepatitis B

¶18. (U) Hepatitis B Virus (HBV) is usually transmitted by dirty needles, during sexual intercourse, or from mother to newborn. The majority of patients infected with HBV eventually clear the infection, but a minority becomes chronically infected. In addition to morbidity from the acute infection, HBV is a major cause of liver failure and liver cancer in chronically-infected HBV surface antigen positive (HBsAg+) individuals. Infection with Hepatitis B Virus (HBV) is one of the DPRK's biggest public health problems, but no country-wide data are available on its overall prevalence. Outside the WHO Expanded Program on Immunization (EPI), which targets infants under one year of age, HBV vaccine is not widely available in the DPRK. According to the Eugene Bell Foundation (EBF), only about 10% of newborns born to HBV-antigen-positive mothers become infected. HBV diagnostic testing is not routine, but patients who present with jaundice are isolated in hepatitis care facilities in district (second-level) clinics until they die or recover. Antiviral treatment for HBsAg+ patients is not available.

¶19. (U) The best HBV data available come from a baseline serosurvey conducted by the Ministry of Public Health and the EBF in 2004 in Wonsan, a northeast coastal city, in advance of a school-based pilot immunization program. Wonsan authorities told EBF that there are approximately 800-1,000 new cases each year in a population of about 310,000, a prevalence of 6-7% in adult populations, and 7-8% HBV antigen+ in pregnant women. The serosurvey of school children aged 7-10 years old found an HIV antigen+ prevalence of 33%. This cohort of school children was born before HBV was incorporated into the EPI immunization program. Independently, the U.S. Centers for Disease Control and Prevention (CDC) assesses DPRK as "highly endemic" for HBV with HBsAg+ prevalence above 8%.

¶20. (SBU) A study of DPRK defectors by South Korea's Ministry of Health showed an anti-HBsAg antibody rate of 83.9%, an indication of nearly universal exposure to the virus at some time in life, and a HBsAg+ rate of 15.4%.

¶21. (U) HBV is a vaccine preventable disease. Ongoing challenges

are to institute a universal immunization program for newborns and

school entrants to complement the existing EPI effort, and to deinstitutionalize the care of patients with jaundice attributed to HBV.

Diarrheal Diseases

¶22. (U) Diarrhea is caused by person-to-person spread, non-potable drinking water, failure to wash hands, contaminated food, unsanitary latrines and sewage, and poor hygienic practices. Poor nutrition is a contributing factor to intestinal diarrhea. Many intestinal bacteria and viruses and a few one-cell parasites (e.g. amoeba, giardia, cryptosporidia) cause acute and chronic diarrhea. Current microbiological techniques can identify the cause of infectious diarrhea in about 80% of cases. North Korea lacks diagnostic laboratories, so the infectious agents causing diarrhea in individual patients or causing epidemics in communities are unknown.

¶23. (U) Diarrhea continues to be the most common cause of childhood illness and hospitalization in DPRK. An October 2002 nutritional assessment revealed that 20% of young children had had diarrhea within the two weeks preceding the survey. This rate was similar to the findings of an earlier nutritional survey in 1998. According to the survey, most DPRK mothers (78.4%) were aware of diarrheal symptoms and indications for referral to a health center. The majority (90.9%) of DPRK children with diarrhea received WHO/UNICEF-recommended home treatments (e.g. oral rehydration solution or rehydration fluids), but few (17.9%) increased their fluid intake and continued eating.

¶24. (U) The DPRK Ministry of Public Health (MOPH) has initiated disease surveillance in two pilot counties (Icheon-gun, Gangwon Province and Pyongsan, Hwanghae Bukdo Province), and reported increases in the numbers of diarrhea cases from mid-August to mid-September 2007 of 45% and 36% respectively. The epidemic investigation should now be completed and the MOPH may eventually share the results with WHO and other partners. WHO is currently awaiting approval of the proposed National Disease Surveillance Report Project.

Acute Respiratory Infections

¶25. (U) Acute respiratory infections, along with diarrheal diseases, are the most common causes of infant morbidity and mortality in developing countries. In a 2000 nutritional survey, the DPRK Government reported that 12.2% of children under five years of age had had an acute respiratory infection in the two weeks prior to the survey. A reported 82.7% of those children were seen by a health care provider.

¶26. (U) Seasonal influenza undoubtedly occurs in DPRK but no information is reported. DPRK suffered an outbreak of H7N1 (not H5N1) avian influenza in chickens in March 2005. No human cases were reported. No suspected cases of Severe Acute Respiratory Syndrome (SARS) have been reported.

Intestinal Parasites

¶27. (U) Most intestinal parasitic infections are caused by Soil Transmitted Helminths (STH) such as ascaris (roundworm), tricuris (whipworm), and hookworm. The DPRK has had a strategic plan to

reduce STH infections through twice-yearly community deworming. As a result, roundworm and hookworm prevalence decreased to 5.0% and 0.1% by the 1980's. Since then, natural disasters, economic slumps, limited water supplies, and improper handling and use of "night soil" have led to wide-spread environmental contamination and increased STH rates. In 2003, the situation reached a low point when only 38 of 2,679 primarily schools dewormed only 14,180 children out of an eligible population of 3,110,620 (0.5%). DPRK conducted a national STH Survey in 2004. The overall prevalence of infection with one or more soil helminth was 42.6%. Roundworm infection was most common (41.1%) and had the highest rates of moderate/severe infection (4.6%) followed by whipworm (27.0%/1.0%) and hookworm (0.3%/0.0%). According to the 2007 UN Children's International Child

Emergency Fund (UNICEF) Action Plan, almost 97% of DPRK children aged two-five years of age will receive deworming tablets this year.

¶28. (U) Intestinal parasite surveys of DPRK defectors found one or more intestinal parasites in 28.9% of them, with the highest rate occurring among teenagers (44.8%). This second figure is remarkably similar to the 42.6% intestinal parasite rate found in the survey of school children in North Korea.

Recent Infectious Disease Outbreaks

¶29. (U) The Good Friends Center for Peace, Human Rights, and Refugees and other NGOs have reported endemic leprosy, high prevalence of head lice and skin infections (tinea and boils), epidemics of measles, scarlet fever, cholera, typhoid fever, paratyphoid fever, hemorrhagic fever, severe hepatitis with liver failure, and tuberculous meningitis among children in military households. (There have also been outbreaks of foot and mouth disease among animals, with a potentially severe economic impact, but the disease does not affect humans directly.)

¶30. (U) The DPRK Government has not recognized or reported any of the above conditions except for measles. Prompt recognition and accurate diagnosis of infectious disease epidemics in DPRK are severely hampered by the secrecy and sensitivity of the Government, and by the virtual absence of microbiologic diagnostic laboratories. Compounding these obstacles is the North's unwillingness to share specimens for diagnosis outside the country. The diagnosis of leprosy, head lice, tinea, and boils can be made by a trained clinician, but most of the other diseases reported by Good Friends require laboratory confirmation to be certain of appropriate treatment.

¶31. (U) The practical effect of these unsubstantiated reports is that donor organizations and NGOs have offered drugs and supplies to DPRK that may be inappropriate or harmful. Scarlet fever is not affected by measles vaccination and penicillin does not affect the clinical course or spread of measles.

Vaccine Preventable Childhood Diseases

¶32. (U) The DPRK participates in the WHO Expanded Program on Immunization (EPI), which is designed to provide infants with primary vaccination coverage during the first year of life. MOPH and WHO partners include UNICEF, the Global Alliance for Vaccines and Immunization (GAVI), and NGOs (including the South Korean Red Cross). Vaccines are distributed from the national level to the provinces for administration at the county level. Each province is assigned an immunization day each month when immunization is

provided at the local level. Prior to the immunization day, section doctors remind households with infants requiring vaccines to attend the clinic. Individual vaccinations are recorded in Child Health Care Cards which remain at the local clinic unless the family moves elsewhere. Newborns are vaccinated against tuberculosis (BCG vaccine) by the attending midwife or physician whether at home or in an institution.

¶33. (U) Official DPRK records indicate relatively high infant immunization rates: 1) BCG: 94% (2004); 2) Measles: 95% (2004); 3) Diphtheria-Pertussis-Tetanus-times 3 (DPT3): 79% (2005); 4) Hepatitis B Vaccine-times 3 (HBV3): 92% (2005); and Poliomyelitis times 3 (Polio3): 97% (2005). HBV vaccines were introduced in 1997. Historical review indicates that coverage with the other EPI vaccines has substantially improved over ten years ago. GAVI has independently verified the reliability of these figures (including the relatively low DPT3 coverage) through an audit of Child Health Care Cards at the local level.

¶34. (U) A review of DPRK reporting of vaccine preventable childhood diseases indicated that the EPI Program is very effective overall.

- BCG/Tuberculosis. BCG vaccine confers significant protection against primary tuberculosis infection in infants and children, but has little or no effect on infection and disease in adults. There is

anecdotal reporting by NGOs that pediatric tuberculosis is increasing, but there are no well-done studies on this subject.

- Measles. On April 20, 2007, a WHO Press Release reported the first measles outbreak in DPRK since 1992. The epidemic occurred in 30 of the 204 counties in DPRK and caused the deaths of two adults and two infants. The DPRK Government reported that 9% of cases occurred in children under the age of five years and 40% in 11-19 year-olds. In response to the epidemic, the DPRK distributed 16 million doses of donated measles vaccine. Measles immunization before one year of age does not protect approximately 30% of infants and re-immunization at 18-27 months is necessary to achieve protection of school children at the 95%-plus level. Re-immunization at school entry or in young adulthood is necessary to convey life-long protection. Information on the percentage of cases from one-four years of age is lacking, but the measles epidemic pattern is consistent with failure to administer a booster dose of measles vaccine and to re-immunize upon school entry, rather than a failure of the EPI Program.

- Diphtheria. The last reported diphtheria cases in DPRK were reported in 1981. Re-immunization with adult diphtheria-tetanus (dT) vaccine is necessary to maintain life-long protection.

- Pertussis (Whooping Cough). Pertussis has persisted in the DPRK. In 2006, DPRK reported 409 cases with no deaths. Pertussis immunity following DPT3 lasts several years. Booster doses are required at school entry to maintain immunity through adolescence. The age breakdown of reported cases would be needed to assess the effectiveness of the EPI Program.

- Tetanus. North Korea has reported no cases of tetanus since 1998, when six neonatal cases were reported. Immunity to tetanus immunization lapses after 10-15 years. Booster immunizations are required to maintain immunity during childbearing years and adulthood. Neonatal tetanus occurs when unvaccinated mothers give birth to infants under unsanitary conditions and the newborn is infected with tetanus spores. No figures were found on the percentage of pregnant women immunized against tetanus.

- Hepatitis B. Immunity against HBV lasts three to five years, depending on the vaccine product administered. Re-immunization is required at school entry and during adulthood to ensure continued protection.

- Poliomyelitis. The DPRK participates in the WHO Poliomyelitis Eradication Program and has not reported a case of paralytic poliomyelitis since before 1980. As part of the WHO Program, the DPRK has reported and investigated 63 cases of acute flaccid paralysis (AFP), none of which was caused by wild poliomyelitis infection. It is not known how many (if any) of the AFP cases were due to adverse effects of the live poliomyelitis vaccine. Immunization with oral trivalent poliomyelitis vaccine (OPV) three times during infancy requires one booster dosage to convey life-long protection.

- Other Vaccine Preventable Diseases. DPRK does not routinely immunize against Haemophilus influenzae type B (Hib - also called bacterial meningitis), rubella (German measles), mumps, or varicella (chicken pox). These diseases are not routinely reported by DPRK.

Sexually-transmitted Diseases

¶35. (U) North Korea does not report sexually-transmitted diseases (STDs). Serologic testing for syphilis is available in Pyongyang, and there have been rumors of syphilis outbreaks during the past ten years. No seroprevalence studies have been done. The ROK Government and NGOs working in the DPRK have noted that, while there is no organized or sanctioned commercial sex in DPRK, food shortages and famine have resulted in women practicing cottage-industry commercial sex work to save themselves and their families.

¶36. (U) Among female defectors, there have been a total of 137 cases of STDs since the testing program was begun in 2004. The annual number of STDs remained between 28 and 35 from 2004-2006, but jumped to 45 in the six months through June 2007. This may be a true increase, or be due to an increased number of female defectors,

to an expansion of STD testing, or to other factors. Since most STDs (syphilis being an exception) have incubation periods in days and many defectors were sexually abused or practiced commercial sex in transit countries, it is difficult to determine where they acquired the STD.

Hemorrhagic Fever with Renal Syndrome

¶37. (U) Hemorrhagic Fever with Renal Syndrome (Hantavirus/Korean Hemorrhagic Fever - HFRS) is caused by members of the bunyavirus family first recognized in Korea during the Korean War among UN military personnel. DPRK reported 316 cases of HFRS from 1961-1997 when reporting stopped. Since mice are the reservoir for the virus and spread the infection through urine and feces, increases in mouse populations and/or lapses in rodent control and increased human-rodent contact may result in human cases. Note: There are numerous anecdotal reports of North Koreans capturing and eating rodents to survive, especially in prison camps. The looming food shortages will likely make this phenomenon more widespread, increasing the risk of hantavirus infection. End note.)

Japanese Encephalitis

¶38. (U) Japanese Encephalitis (JE), the most common cause of viral encephalitis in Asia, is endemic on the Korean Peninsula. JE is

transmitted by Culex mosquitoes; wild birds are the natural host, and domestic pigs are reservoirs for the virus. South Korea has largely controlled JE through immunization programs and the reduction of human-pig interaction. North Korea does not routinely immunize against JE. The International Vaccine Institute (IVI) in Seoul launched a pilot program in February and March this year, immunizing two cohorts of 3,000 children each in Nampo and Sariwon (municipalities west and south, respectively of Pyongyang) against JE and Hib (bacterial meningitis). IVI will follow up to assess safety and efficacy in the DPRK setting.

Rickettsial Diseases

¶39. (U) Scrub typhus (Orientia tsutsugamushi) and murine typhus (Rickettsia typhi) are endemic to the region, but no data are available because these are not notifiable diseases and due to a lack of laboratory diagnostic capability.

Other Parasitic Diseases

¶40. (U) The June 2007 issue of the Korean Journal of Parasitic Diseases reported on an ELISA test serological survey of 137 DPRK citizens resident along the China border and 133 female defectors resident in ROK, testing for Clonorchis sinensis (lung fluke), Taenia solium (pork tape worm, the causative agent of cysticercosis), and Sparganum, a second cestode parasite. Among the 270 specimens tested, 11.5%, 9.3%, and 4.1% tested positive for immunoglobulin G (IgG) to the antigens of these specific parasites. Overall, 38.2% of men and 15.8% of women were positive to one or more of these pathogens. The results suggest that these parasites may be highly prevalent in some areas of DPRK. Paragonimiasis (lung fluke) was once common on the Korean Peninsula and entered into the differential diagnosis of tuberculosis. The Korean Institute of Tuberculosis reports that this disease is very rare in ROK and has not been found in DPRK defectors.

DISEASE MANAGEMENT CAPABILITIES

¶41. (U) North Korea, in contrast to most developing countries, possesses an organized four-level healthcare system. It is staffed at the first, or local, level with "quasi-physicians" who receive three years of medical training and who are responsible for the medical care of 200 families. Primary care, health education, and prevention programs are carried out at the local level. Although the first-level primary facilities suffer severely from lack of

electricity, heating, basic equipment, and drugs or vaccines, indications are that they are usually staffed by dedicated, hard-working, and resourceful health staff who try to make the best of the circumstances.

¶42. (U) Second-level (district) clinics provide basic medical care and tuberculosis and hepatitis resident care. Third-level (provincial) hospitals provide both ambulatory and inpatient care. Fourth-level national and specialty hospitals are located primarily in Pyongyang and provide health services to members of the elite. Comparatively speaking, Pyongyang-based health facilities are better staffed and equipped than those at the provincial, district, and local level, but shortages of electricity, fuel, safe water supplies, refrigeration, functional diagnostic equipment, microbiological laboratories, vaccines, and medications exist throughout the system. Essential drugs (including antibiotics) are usually not available within the health system and must be obtained by the patient in the open or "black" market. The sources and quality of these drugs are open to question.

Obstacles to the Provision of Care

¶43. (U) The absence of electrical power at the first-level healthcare facilities, and intermittent or fluctuating power at secondary, tertiary and national facilities, have a profound impact on the ability to run both basic equipment (e.g. refrigerators, microscopes, X-ray machines) and more sophisticated medical devices. The recent announcement of a USD 4 million USAID Energy Assistance Program, to provide generators at rural and peripheral health clinics through U.S.-based NGOs, will help address this obstacle. The money will be disbursed in two tranches of USD 2 million each.

¶44. (U) The scarcity and low quality of fuel in the DPRK may be a limiting factor in efforts to combat the shortage of electricity by providing generators. During the frequent interruptions to electrical power, generators may be used intermittently or only when there is the need to run a diagnostic test. This practice will not only adversely affect the storage of vaccines and medicines that require refrigeration, but may damage the equipment.

¶45. (U) Urban areas of North Korea had urban water supplies and sewage systems, but these facilities have deteriorated to the point where sewage contamination of water supplies is frequent, and many hospitals are without reliable running water regardless of potability. Frequent hand-washing is the critical feature of effective infection control in the hospital and clinic setting. Rural areas usually do not have potable water or sewage disposal.

¶46. (U) With the exception of the EPI and blood banking in the Pyongyang area, DPRK does not have access to disposable needles, infusions, surgical equipment, or disposable gloves. As a result of the lack of electricity and water, needles, syringes, and equipment are either chemically disinfected or reused with multiple patients.

¶47. (U) A "cold chain" is essential for the successful execution of immunization programs as well as for proper storage of many infectious disease diagnostic kits and most injectable antibiotics. Multiple sources indicate that there is no functional "cold chain" or reliable refrigeration in DPRK. In a broader sense, the lack of refrigeration will have an impact on food safety and food-borne infectious diseases.

Obstacles to Reliable Diagnoses

¶48. (U) First-level clinicians usually do not have thermometers, stethoscopes, blood pressure cuffs, or microscopes. Without thermometers and microscopes, it is not possible to confirm febrile conditions for referral, let alone diagnose specific pathogens. Tertiary level and central hospitals also lack X-ray machines (relying instead on dangerous fluoroscopy) and supplies such as X-ray plates. Maintenance and repair of existing or donated equipment is a serious problem.

¶49. (U) In all his research and interviews, Dr. Western was unable

to identify a single functioning general or specialized microbiology diagnostic laboratory anywhere in DPRK. Most infectious diseases cannot be diagnosed without serological and/or microbiological confirmation. Recent examples in North Korea are the fact that 75% of malaria cases are not confirmed by peripheral blood smear, and

recent epidemics of scarlet fever and measles could not be confirmed because of a lack of diagnostics. At present, limited numbers of tuberculosis specimens from the DPRK are being cultured and tested for drug susceptibility in South Korea, but the DPRK does not seem to be connected to various WHO Collaborating Centers and other diagnostic and reference networks.

A Strength -- Human Capital

¶50. (SBU) The DPRK's greatest strength in infectious disease management and public health is its health infrastructure, which reaches to the community and family level. The IVI reports that members of the DPRK Academy of Medicine with whom they collaborate are extraordinarily well-read and up-to-date on the medical literature, but have had no opportunity to apply or practice the latest advances and developments in infectious diseases diagnosis, prevention, or control. There are three teaching hospitals in Pyongyang, but once again the training is largely theoretical. North Korea has an adequate supply of fully trained "quasi-physicians" to meet its citizens' needs, but does not pay them or provide them with drugs or vaccines to practice their profession. As usual in a system relying on "quasi-physicians," the nursing profession is under-represented (MD/RN ratio of 1:1) and under-utilized. The consensus among NGOs active in the DPRK is that medical and nursing staffs are knowledgeable at all levels about medical care. However, several NGOs, including EBF, indicated that the understanding of sanitation and antisepsis was frequently lacking or inadequate.

Treatment and Immunization Programs

¶51. (U) There is a major effort through WHO and NGOs to maintain a DOTS program to treat tuberculosis in DPRK. A second treatment program is the recently rejuvenated Soil Transmitted Helminth (STH) school-based deworming program. Other treatment programs such as penicillin therapy for strep throat are frustrated by the lack of microbiologic culture and antibiotics (i.e. penicillin). The STH Program may provide a framework or template to establish a school immunization program to provide booster vaccination in follow-up to the EPI Program.

¶52. (U) The DPRK is completely dependent on external procurement and donations for the vaccines used in the EPI. The DPRK is not capable of producing any vaccines at the present time or in the foreseeable future. On the other hand, as a socialist country with a healthcare system penetrating to the local (200 family) level, the DPRK is in a position to educate and mobilize families to participate in public health activities. The monthly Immunization Day in the EPI Program is a successful example of this approach. EPI must be supported and sustained, but it is focused only on infants under one year of age. EPI's goals are in danger of being undermined by inadequate attention to pre-natal care (nutrition, HBV serology testing, tetanus toxoid), newborn programs (HBV vaccination), and vaccine boosters upon starting school.

EXISTING EFFORTS TO AID HEALTHCARE IN THE DPRK

¶53. (U) U.N. agencies, particularly WHO and UNICEF, have long-standing assistance programs in North Korea. The DPRK is dependent upon these and other international organizations for the most of their essential drugs and vaccines. While the DPRK

Government health priorities are disease-specific, the top WHO technical assistance program priorities include: 1) disease prevention and control; 2) vaccines and immunization; 3) evidence-based health policies and health care (clinical guidelines, rational drug use); 4) strengthening basic health services at the community level; 5) medical education and updating of health

personnel technical skills; 6) blood safety; 7) strengthening technical and research capacity in public health and epidemiology; 8) health system development; 9) tobacco control; and 10) increasing MOPH capability to partner.

¶54. (U) There are several U.S.-based NGOs that are active in the DPRK, most notably the EBF (which also has a base in Seoul), Samaritan's Purse, Mercy Corps, and Global Resource Services. EBF, in particular, has been very active in combating tuberculosis in the North.

¶55. (U) According to the ROK-based NGO Anum International, there are 55 South Korean NGOs providing assistance to the DPRK. Twenty of these NGOs are operating in the health sector. During his ESF period in Seoul, Dr. Western met with ten of these organizations: 1) Anum International; 2) Eugene Bell Foundation (EBF); 3) Foundation for Inter-Korean Medical Cooperation (FIKMC); 4) "Good Friends" Center for Peace, Human Rights, and Refugees; 5)"Good Neighbors" International; 6) "Join Together" Society (JTS); 7)Korean Health Industry Development Initiative; 8) the Korean Institute of Tuberculosis (KIT); 9) the Korean Medical Association (KMA); and 10) the Korean Red Cross.

¶56. (U) With the exception of KMA and KIT, the organizations that Dr. Western consulted are humanitarian assistance organizations in which health is one of several program areas. Except for "Good Neighbor" and "Join Together", the NGOs' international humanitarian experience was limited to North Korea. Many of the NGOs had medical and/or public health advisors, but only KMA had medical leadership with clinical expertise in clinical and laboratory diagnosis or the medical management of infectious diseases.

¶57. (U) Typically the ROK-based NGOs respond to requests from the DPRK Government. At least in the initial years of their relationship, there is little or no opportunity to negotiate and modify the request, determine the field site or point of delivery (usually Pyongyang), or verify the delivery and use of the donations. (See ref B for an analysis of the difficulties faced by South Korean NGOs trying to work in North Korea.)

¶58. (U) The MOU indicated that it has no formal coordinating body for the many ROK-based NGOs active in the DPRK, but Anum International indicated that it is currently the lead agency in an informal health network that meets quarterly (and as needed) to exchange information and coordinate efforts. Similar informal networks exist among NGOs assisting with agriculture and emergency response. Because of their broad mission, many NGOs participate in more than one network. The MOU also has an NGO consultative body that meets quarterly.

¶59. (U) Some bilateral donors, such as the Italian government, are involved in efforts to strengthen healthcare and improve healthcare facilities in the DPRK.

POTENTIAL AREAS FOR U.S. INVOLVEMENT

¶60. (SBU) There are several potential areas where the U.S.

Government could consider providing health-related humanitarian or technical assistance, if the future evolution of the U.S.-DPRK relationship leads to deeper U.S. engagement there.

- Electrical Power. First steps have been taken by the recent award by USAID of the first tranche (USD 2.0 million) of a USD 4 million program to provide generators to first-level health clinics. The award was given to four U.S.-based NGOs. If successful, this program could be expanded. Provision of electrical power is crucial to the proper storage of drugs and vaccines, light microscopy, and the operation of X-ray machines, medical equipment, and surgical suites. Gasoline- or diesel-powered generators may be difficult to sustain. Consideration should be given to low-technology solar generators to provide core services.

- Potable Water. The availability of potable drinking water is critical to the prevention of diarrhea and other water-borne diseases. Consideration should be given to the provision of

chlorination tablets and educational programs to use them. A second approach would be a program to construct tube wells along with provision for maintenance.

- Microbiological Diagnosis. Short of establishing a central microbiological and reference laboratory in Pyongyang, the U.S. could consider providing infectious disease diagnostic kits to provincial and district healthcare facilities for the diagnosis of bacterial and viral diseases of public health importance (e.g. tuberculosis, influenza, hepatitis, typhoid fever, and measles).

- National Immunization Program. The DPRK national immunization program is one of the few functional public health programs at the present time. A major drawback of the program is that it focuses on the immunization of infants before the age of one year. The epidemics of vaccine preventable diseases that DPRK is experiencing are due to infections in older children who have not received booster immunizations. The U.S. could consider sponsorship of a school-entry immunization program providing booster doses of pediatric vaccines.

- Tuberculosis. The Eugene Bell Foundation, a U.S.- and South Korea-based NGO, is the major player in providing technical assistance and support to tuberculosis diagnosis and treatment in the DPRK. Eugene Bell is also one of the four U.S.-based NGOs participating in the USAID electric generator project. The U.S. National Institutes of Health (NIH) have received an invitation from the Eugene Bell Foundation to develop a tuberculosis research component to ongoing and planned activities.

- Hepatitis. There are licensed vaccines against hepatitis A virus (HAV) and hepatitis B virus (HBV). HBV vaccine could be incorporated into NIP for infants and school-entry programs.

- Intestinal Parasites. DPRK has a functional school deworming program. Roundworm and hookworm are among the infections recognized in the new U.S. Neglected Tropical Diseases Initiative. The U.S. could consider including the DPRK in the Initiative.

- Training. DPRK physicians, nurses, and biomedical scientists have been isolated from advances in medicine and public health for sixty years. While medical and nursing students are trained to provide good care, they are not provided with the scientific basis of medical practice. They also suffer severely from lack of access to diagnostic tools, drugs, and prevention products. The USG could explore offering refresher training for medical and academic leaders on-site or through distance learning. USG agencies such as the

Centers for Disease Prevention and Control (CDC) and the National Institutes of Health (NIH) could be approached to lead this effort.

COMMENT

¶61. (SBU) Health conditions in the DPRK will deteriorate further as the looming food shortages strain immune systems. U.S. humanitarian aid will need to be focused on nutrition in the short term. For the longer term, should the evolution of the U.S.-DPRK relationship lead to deeper U.S. engagement with North Korea, the U.S. will find numerous options in the health sector for reaching out to the North Korean public in ways that could have a lasting impact. End comment.

VERSHBOW